

Net-Pen Aquaculture

Michigan 4-H
Youth Conservation Council

The mission of the 2016 Michigan 4-H Youth Conservation Council is to raise awareness of the effects net-pen aquaculture has on the environment and to educate the public on opposing views. The council recommends not implementing net-pen aquaculture, but includes suggested recommendations if legislation supporting the topic is introduced. These recommendations would serve to protect the environment, the people of Michigan, and the welfare of commercial industries.

Net-Pens

- Large nets
- Close to shore
- Location
- Management



www.seachoice.org

Cheyenne

Aqua vs. Mariculture

- Location
- Species
- Type of containment



www.karmachifarm.com

Cheyenne

Dangers of Phosphorus

- Fish waste
- Dead fish
- Excess food



oceanservice.nasa.gov

Dan

Vulnerability of Winter

- Lack of accessibility
- Build up of dead fish



www.falconerphotography.com

Dan

Net Pen Operations

- Sufficient water flow
- Certain criteria for the structure of net-pens to ensure safety of livestock
- Types of fish to use: infertile fish
- Potential diseases for the fish
- Vaccines to prevent disease



Kaitlyn B

vaccineliberationarmy.com

Biological Effects of Large Scale Net-Pen Operations

- Impact of escaped fish on native populations
- Transference of diseases to native species
- High concentrations of fish lead to lower biodiversity



www.aquaculture.co.il

Kaitlyn H

Biological Effects on Native Fish Populations

- Fecal bacteria and viruses
- Antibiotics in fish lead to resistance of diseases
- Low oxygen levels



www.yellowstonegate.com

Kaitlyn H

Commercial Uses

- Farming fish to restore populations
- Enhancing sport fisheries
- Community-based management
- Community-based education



www.resolutecharters.com

Ethan

Imports

- The United States imported \$16 billion in 2011
- Less than \$6 billion was produced
- Aquaculture could improve the economy



www.foodsafetvnews.com

Ethan

Employment

- In Canada 90% of the aquaculture farms are located in rural areas
- 67% of their employees are under the age of 35



fishconsult.org

Emily

Employment Opportunities

- Fish farm technician
- Farm manager
- Hatchery technician
- Environmental and regulatory affairs manager
- Education and training process could depend on the occupation



Emily

theosophywatch.com

Net-Pen Aquaculture in Norway

- Jobs
- Food production
- Boost in economy

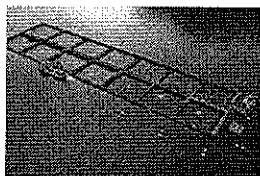


en.seafood.no

Peter

Net-Pen Aquaculture in Canada

- Years of experience
- Only had one problem



Peter

commonsensecanadian.c

a

Norwegian Study

- Recirculating Aquaculture System cost \$32 million and earned \$5.55 million
- Net Pen cost \$12.3 million and earned \$4.68 million



bbc.com



stanford.edu

Megan

Canadian Study

Technology	Initial Investment	First-year Income	Return on Equity
Net Pen	\$5,000,716	\$2,841,147	52%
Rigid – with aeration	\$23,284,470	\$2,125,885	-10%
Rigid – pure oxygen	\$24,004,470	\$253,079	-2%
Flexible – pure oxygen	\$29,332,036	\$2,041,169	-9%
Land-based grade	\$72,352,066	\$17,417,907	-20%
Land-based below grade	\$67,748,173	\$13,496,265	-19%
Land-based liquid oxygen injection	\$19,628,900	\$403,142	-4%
Land-based LOX Mechanical filtration	\$18,858,085	\$260,773	-2%
Recirculating aquaculture system	\$22,672,885	\$381,467	-4%

Megan

dfo-mpo.gc.ca

Negative Economic Impacts

- Drinking water supply
- Tourism
- Boating
- Fishing
- Bird watching



www.greeceturkeytours.com

Allison

Negative Economic Impacts

- Commercial fisheries
- Property values



www.alutianseast.org

Allison

Canadian Legislation

- The Fisheries Act
- Canadian Environmental Assessment Act
- Code on Introductions and Transfers of Aquatic Organism
- Fish Health Protection Regulations
- Feed Act



www.kenoraonline.com

Jerry

Licensing, Waste, Management, and Regulations

- Permits and binational laws
- Waste elimination
- Management skills
- Rules for net-pens



leangeneis.com

Ophelia

Michigan Bills

- Sen. Rick Jones interview
- 2016 House Bill 5255: Ban Great Lakes aquaculture
- Senator Darwin Booher interview
- NOAA Support



wamc.org

Rachel

Current State Regulations

- A regulatory analysis of proposed net pen aquaculture in the Great Lakes
- Michigan Sea Grant
- MDEQ, MDARD, and DNR
- National Aquaculture Act of 1980



wdol.org

Rachel

Council Recommendations

- Use infertile/triploid fish
- Regulate antibiotics
- Use native or naturalized fish species
- Restrict possible locations to protect wildlife
- Use pelleted food only
- Adopt policies from Canada
